

Beam Systematics

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21 Sept. 2003

Status:

- GNUMI Version 15
- exec minos1.fnal.gov:~messier/beam/v15/chain.kumac
current set of simulations
- See gnumi/kumacs area in CVS for utilities for working w/ ntuples
- Detailed target models based on FLUKA03 and MARS

Last Time...

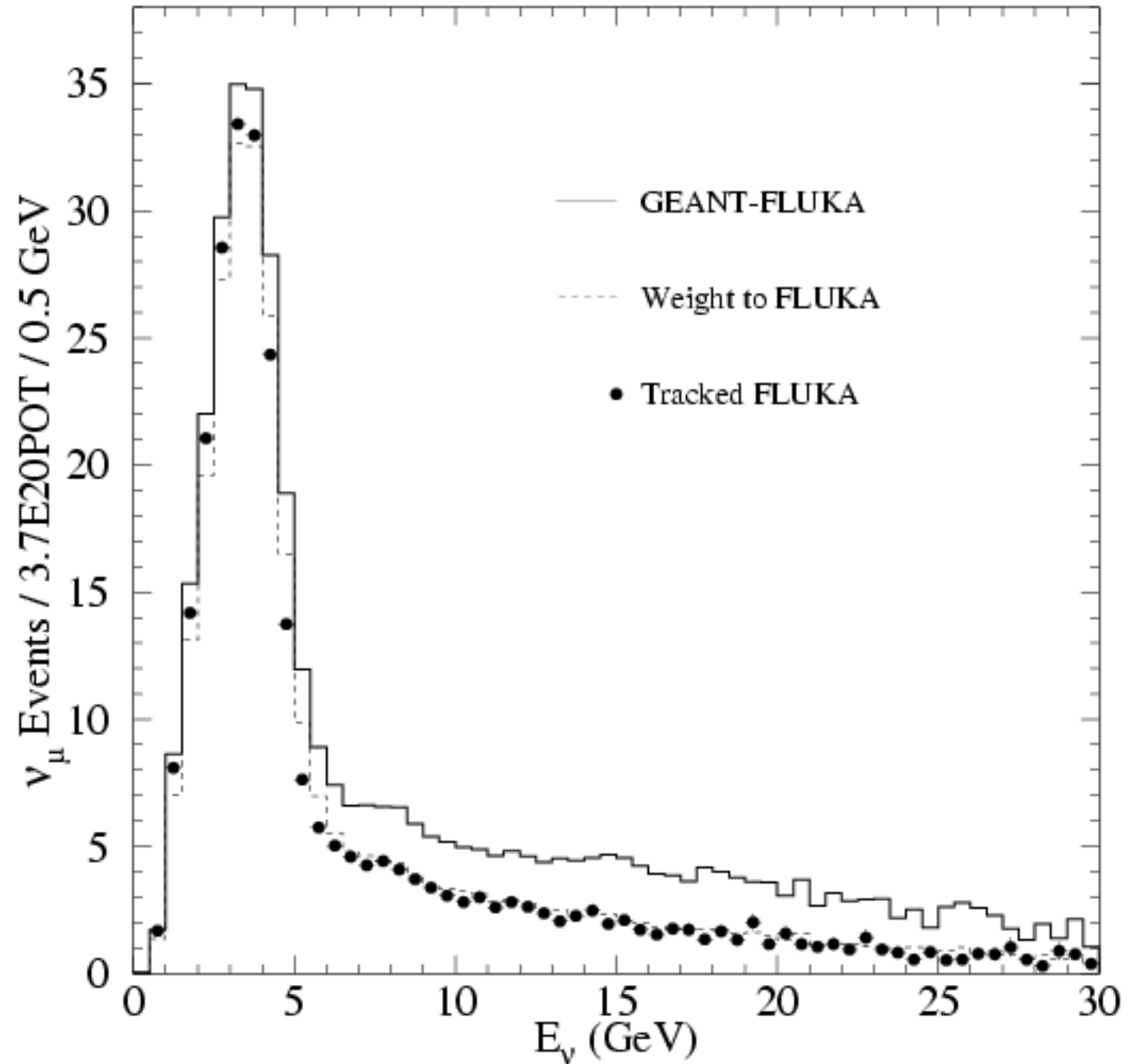
- Showed GEANT-FLUKA to FLUKA comparison based on reweighting. Apparent disagreement with previous “tracked” results.
- Bob Z. found a mistake by Mark M. affecting weighting function
- Mark M. retracked Bob Z.'s target hadrons
- > New results: Basically agree with old reweighted results. Unclear why old tracked results were different
- Remaining differences between tracked and weighted results most likely due to application of same weight to all target production z locations. Bob Z. developed set of production weights with account for z position of target. Still requires some shaking out...

ν_μ Spectrum

GEANT-FLUKA
FLUKA using weights
FLUKA using tracked
hadrons

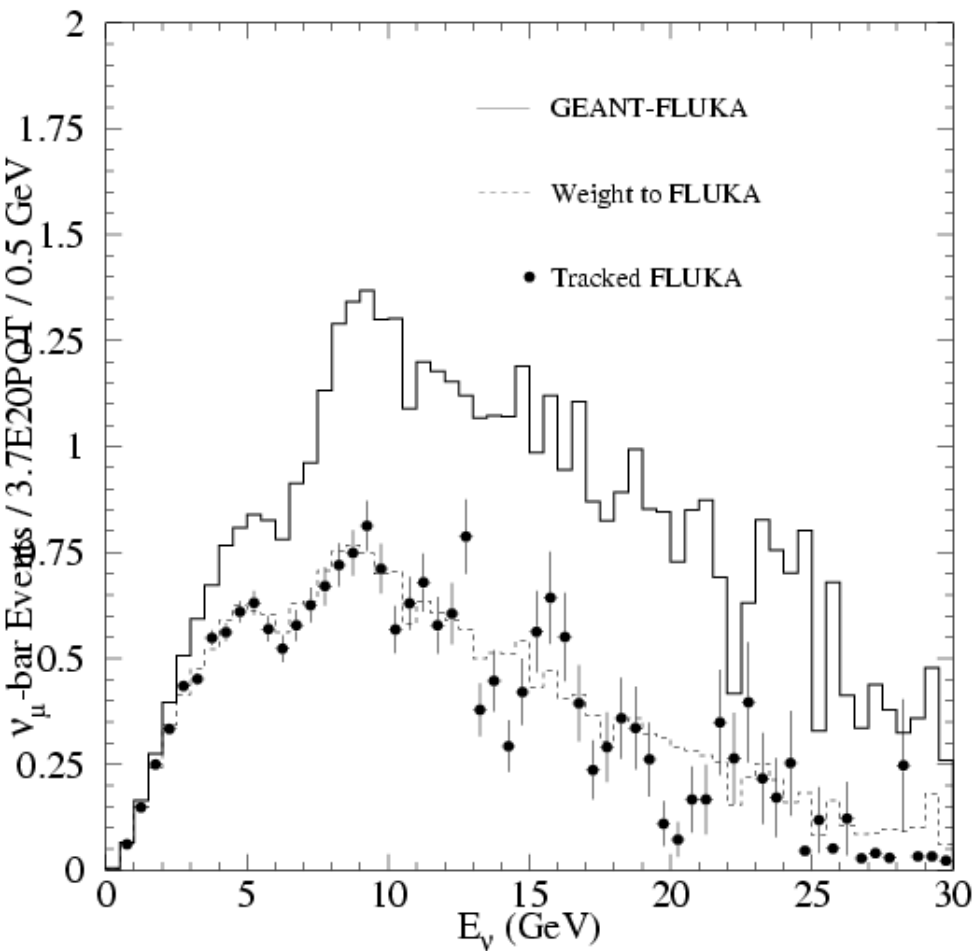
5-15% differences between
weighted and tracked
results

Same weights applied to all
z production locations on
target – probably accounts
for differences



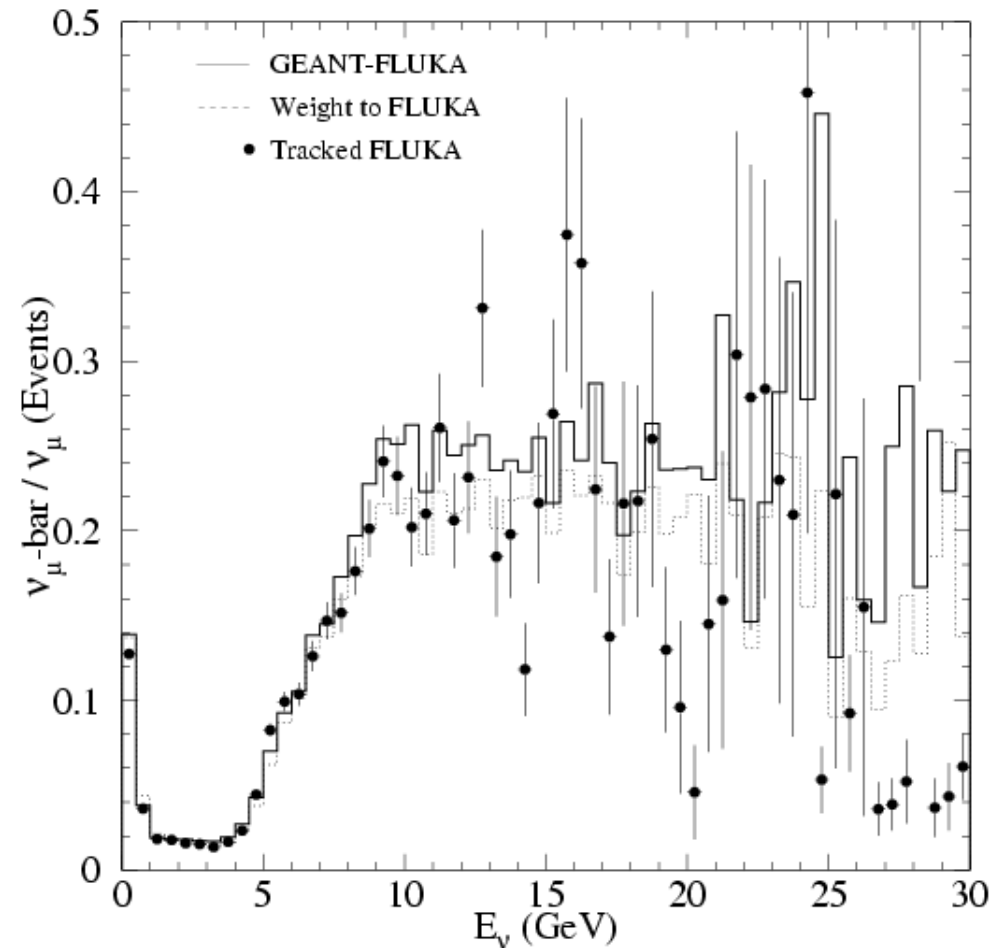
ν_{μ} -bar Rates

ν_{μ} bar / nm ratio very stable



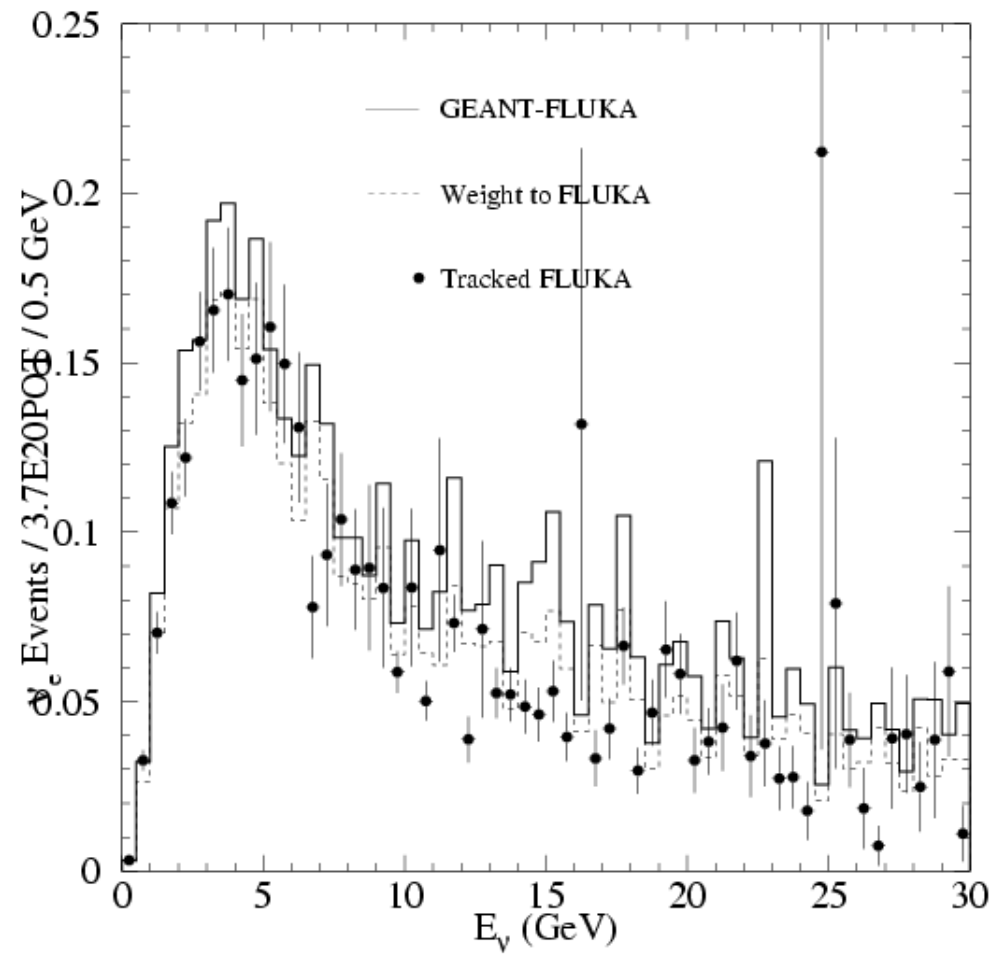
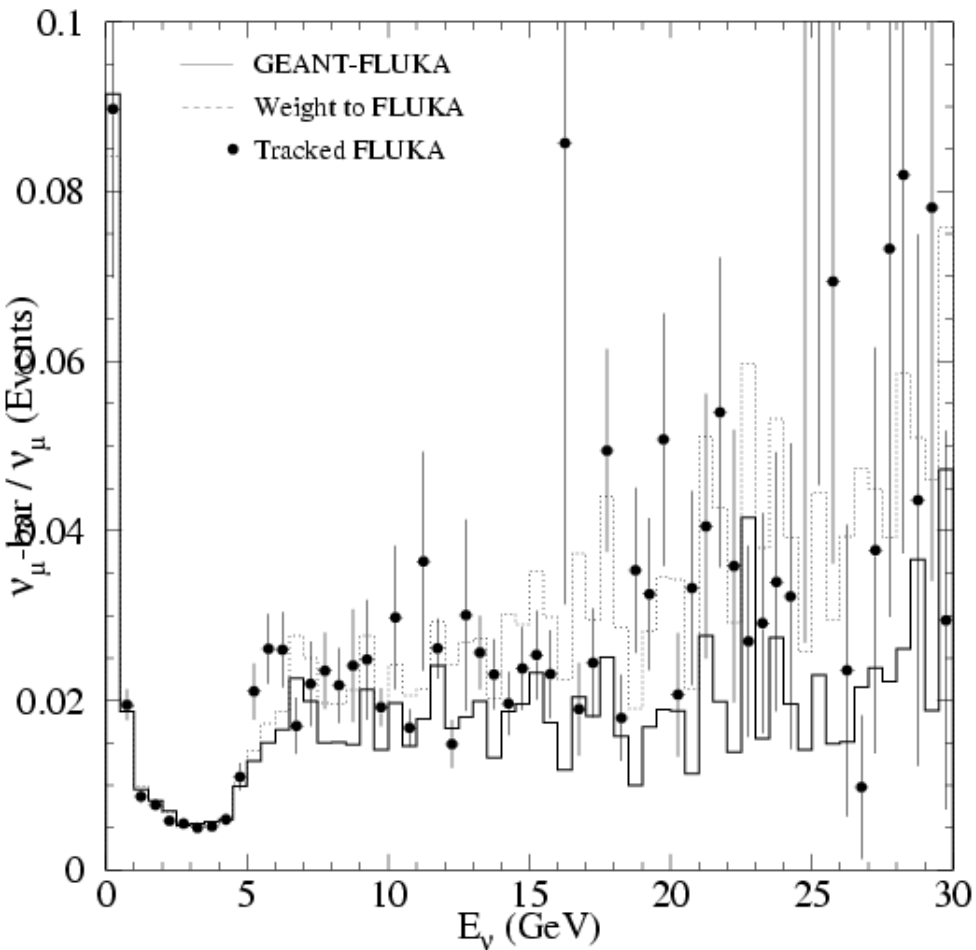
Over all suppression of HE tail visible

Good agreement between tracked and weighted



ν_e Rates

Good consistency in rates between models



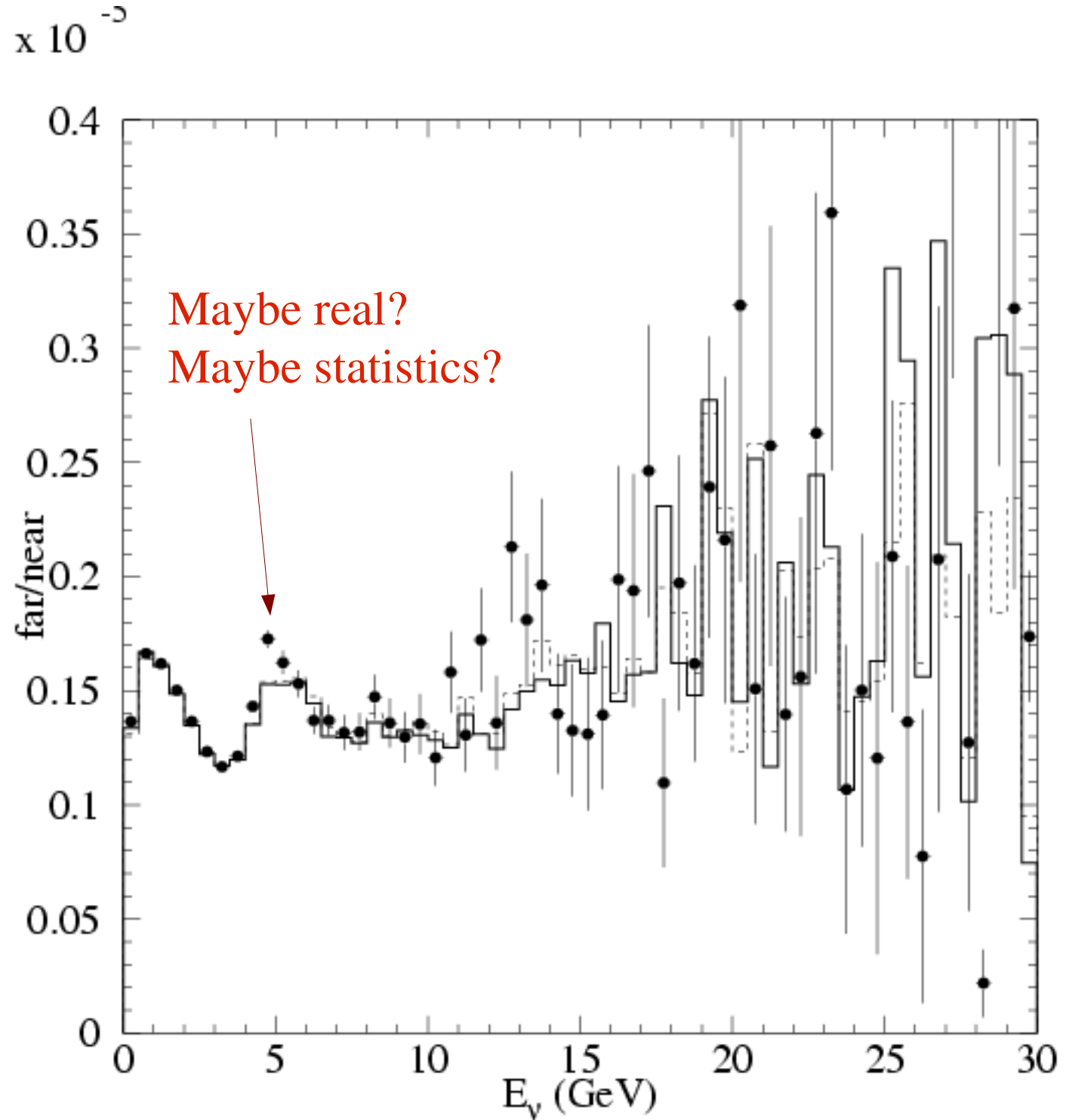
Suppression of high- x production increases ratio at higher energies

Far/Near

Far/Near stable

Possible trouble spot
at 5 GeV.

This region is right
on edge of
horn acceptance
and may be sensitive
to z location of
production on
target



More Weights...

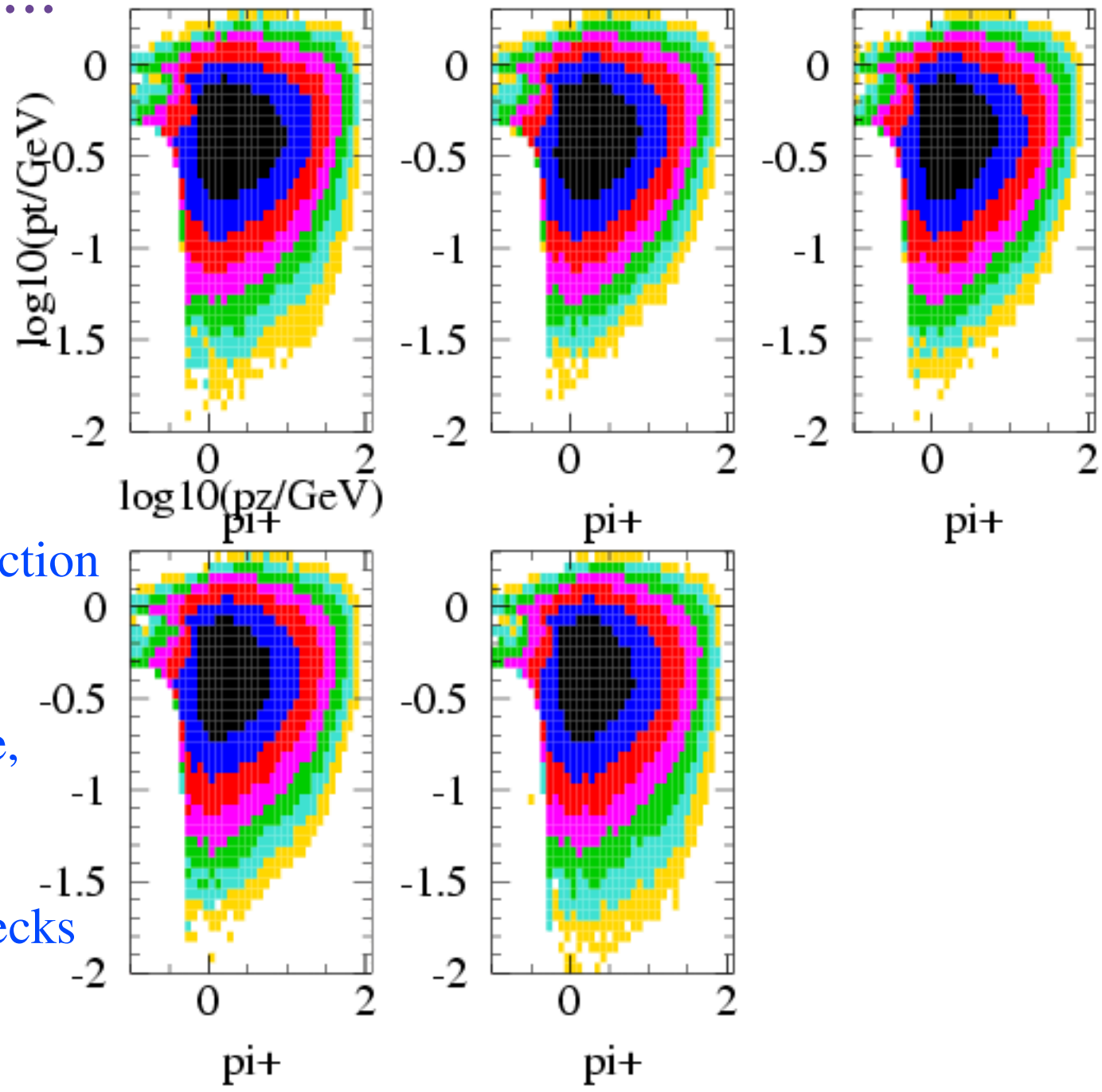
Weights as function of production z

Bob Z. worked out weights in different z bins along target

Left shows π^+ production in his 5 z bins

Differences are subtle, but they are there...

A few more cross-checks needed



On the horizon...

- I suggest we use the z-weighted FLUKA fluxes when they are ready (~few days) for official samples
 - [1] Should reproduce tracked results very well
 - [2] More convenient to reweight rather than re-track...

- GNUMI V16:

Jim H. et al. Measured B field in “field free” region of horn
~100 gauss at neck. Has some radial component.

V16 will incorporate these measurements and add a little bit more detail to the geometry.